

PAINT & PIXEL

Terminology of Colour Science

"A"

Redness-greenness coordinate in certain transformed colour spaces (Hunter L,a,b or CIELAB), generally used as the difference in "a" between a specimen and a standard reference colour. If "a" is positive, there is more redness than greenness; if "a" is negative, there is more greenness than redness. It is normally used with b as part of the chromaticity or chromaticity colour difference.

Absolute data

colour measurement data presented without comparison of the sample to a standard or calculated colour difference.

Absorption

- (1) penetration of one substance into the mass of another.
- (2) decrease in directional transmittance of incident radiation (such as light), resulting in a modification or conversion of the absorbed energy, into heat, for example. Light incident on a specimen may be partially reflected, partially transmitted, or partially absorbed.

Absorption tinting strength

relative change in the absorption properties of a standard white material when a specified amount of an absorbing colourant, black or chromatic is added to it.

Accuracy

the closeness of agreement between a test result and an accepted reference value (often used as a colour instrument specification).

Achromatic

- (1) for primary light sources, the computed chromaticity of the equal-energy spectrum.
- (2) for surface colours, the colour of a whitish light, serving as the illuminant, to which adaptation has taken place in the visual system of the observer.
- (3) perceived as having no hue, that is, as white, gray, or black.

Additive colour mixture

superposition or other nondestructive combination of lights of different perceived colours.

Angle of illumination

angle between the specimen normal and the illuminator axis.

Angle of view

angle between the normal to the surface of the specimen and the axis of the receiver.

Aperture

the measurement opening in a typical reflection colour instrument. The size of the aperture determines the size and type of sample that can be measured.

Appearance

manifestation of the nature of objects and materials through visual attributes such as size, shape, colour, texture, glossiness, transparency, opacity, etc.

Artificial daylight

term loosely applied to light sources, frequently equipped with filters, which are claimed to reproduce the colour and spectral distribution of daylight. A more specific definition of the light source is to be preferred.

Attributes of colour

- (1) for the object mode of appearance, hue, lightness, and saturation. In the Munsell system, Munsell Hue, Munsell Value, and Munsell Chroma.
- (2) for the illuminant or aperture mode, hue, brightness, and saturation.

Averaging

a method of colour measurement that allows you to average several measurements into one colour measurement. Averaging is recommended when measuring standards or samples with surface variation. Usually the sample is turned 90° between measurements.

"B"

yellowness-blueness coordinate in certain colour spaces (Hunter L,a,b & CIELAB), generally used as the difference in "b" between a specimen and a standard reference colour, normally used with "a" or "a" as part of the chromaticity difference. Generally, if "b" is positive, there is more yellowness than blueness; if "b" is negative, there is more blueness than yellowness.

Basic colour terms

a group of 11 colour names found in anthropological surveys to be in wide use in fully developed languages: white, black, red, green, yellow, blue, brown, gray, orange, purple, pink.

Beer's law

the absorbency of a homogeneous sample containing an absorbing substance is directly proportional to the concentration of the absorbing substance, often used in mixture prediction of transparent materials.

Interference filter

filter constructed of extremely thin alternate layers of high and low refractive-index material and capable of transmitting narrow spectral bands formed by constructive interference within the desired waveband and destructive interference at other wavelengths (used in filter colourimeters and some abridged spectrophotometers).

Just-perceptible difference

colour difference that is just large enough to be perceived by an observer in almost every trial.

Kubelka-Munk theory

phenomenological turbid-medium theory relating the reflectance and transmittance of scattering and absorbing materials to optical constants (Kubelka-Munk absorption coefficient (K), Kubelka-Munk scattering coefficient (S)) and the concentrations of their colourants. (The basis of computer colour-matching calculations)

LED, light emitting diode

solid state light emitters that are extremely stable and durable, the latest technology in colour instrument light sources.

Light

- (1) electromagnetic radiation of which a human observer is aware through the visual sensations that arise from the stimulation of the retina of the eye. This portion of the spectrum includes wavelengths from about 380 nm to 780 nm. Thus, it is incorrect to speak of ultraviolet or infrared "light" because the human observer cannot see radiant energy in the ultraviolet and infrared regions.
- (2) light referring to the colour of a non-self-luminous body, having a high luminous reflectance factor, as "light green" or "light gray."

Lightfastness

the ability of a material to withstand colour change on exposure to light.

Lightness

- (1) the attribute of colour perception by which a non-self-luminous body is judged to reflect more or less light.
- (2) the attribute by which a perceived colour is judged to be equivalent to one of a series of grays ranging from black to white.

Light source

an object that emits light or radiant energy to which the human eye is sensitive. The emission of a light source can be described by the relative amount of energy emitted at each wavelength in the visible spectrum, thus defining the source as an illuminant, or the emission may be described in terms of its correlated colour temperature.

Lovibond tintometer

instrument for evaluating the colours of materials by visual comparison with the colours of glasses of the Lovibond colour system.

Luminescence

emission of light ascribable to nonthermal excitation.

Luster

the appearance characteristic of a surface that reflects more in some directions than it does in other directions, but not of such high gloss as to form clear mirror images.

Masstone

in paint technology, a pigment-vehicle mixture containing a single colourant only.

At times colourants are developed or recycled that contain more than one pigment, but that are tested and used as if they contained only a single pigment. This definition is meant to include such colourants.

Match

to provide, by selection, formulation, adjustment, or other means, a trial colour that is indistinguishable from, or within specified tolerances of, a specified standard colour under specified conditions.

~~Matte~~

lacking luster or gloss. Synonymous with "flat" in paint terminology.

Metameric

- (1) pertaining to spectrally different objects or colour stimuli that have the same tristimulus values.
- (2) pertaining to objects, having different spectrophotometric curves that match when illuminated by at least one specific illuminant (viewing condition) and observed by a specific observer.

Metamerism

property of two specimens that match under a specified illuminator (illuminant) and to a specified observer and whose spectral reflectances or transmittances differ in the visible wavelengths and may appear to be a miss match under a second specified illuminant to the same specified observer.

Munsell colour system

a system of specifying colours of surfaces illuminated by daylight and viewed by an observer adapted to daylight, in terms of three attributes: hue, value, and chroma, using scales that are perceptually approximately uniform.

Munsell notation

- (1) the Munsell hue, value, and chroma assigned to the colour of a specimen by visually comparing the specimen to the chips in the Munsell Book of Colour.
- (2) a notation in the Munsell colour system, derived from luminous reflectance Y and chromaticity coordinates x and y in the 1931 CIE system for standard illuminant C, by the use of scales defined by the Optical Society of America Subcommittee on the Spacing of the Munsell Colours.